

CLAIMS

1. A method for establishing a one-to-one voice communication in a communications system having different control plane and user-plane logical entities, comprising the steps of

5 starting a one-to-one call by call setup signaling embedded in a user-plane traffic sent from a calling subscriber to one of said user-plane logical entities, said embedded signaling identifying a called subscriber,

10 establishing, in response to said embedded call setup signaling, a logical call path between the ones of said user-plane entities which are to be involved in routing of the call related user-plane traffic,

assigning a call identifier to said call, and

15 forwarding any subsequent user-plane traffic relating said call and containing said call identifier over said call path from said calling subscriber to said called subscriber.

20 2. A method according to claim 1, wherein said step of establishing a logical call path comprises forwarding said user traffic with the embedded call setup signaling to said called subscriber and establishing a logical call path between the ones of said user-plane entities through which the embedded call setup signaling is routed.

25 3. A method according to claim 1, wherein said step of establishing a logical call path comprises initiating, in response to receiving said embedded call setup signaling from said calling subscriber, a control-plane procedure to program said user-plane entities which are to be involved in routing of the call related user-plane traffic, to support said call.

4. A method according to claim 3, wherein the one of said user-plane entities which serves the called party generates and sends a call setup signaling embedded in user-plane traffic and containing said assigned call identifier to said called party.

30 5. A method according to claim 1, comprising a step of forwarding any subsequent user-plane traffic relating said call over said call path from said called subscriber to said calling subscriber.

6. A method according to claim 1 or 2, wherein said user-plane traffic comprises real-time audio transport packets.

35 7. A method according to claim 6, wherein the embedded signaling comprises real-time audio transport packets having specific payload types.

8. A method for establishing a one-to-one voice communication in a communications system having different control plane and user-plane logical entities, said method comprising the steps of

5 starting a packet-mode voice communication by sending a user-plane leader packet from a calling user to a first user-specific logical user-plane network entity serving said calling user, said leader packet containing identifier of said sending user and a receiving user,

10 creating, in response to receiving said user-plane leader packet from said calling user, a logical user-plane channel between said first user-plane entity and a second user-specific logical user-plane network entity serving said called user,

15 assigning a call identifier to said call,
sending a user-plane leader packet from said second user-plane entity to said called user, said leader packet containing said call identifier,

20 notifying said call identifier to the calling user by a user-plane communication,

sending user-plane voice packets provided with said call identifier from said calling user to said first user-plane entity,

forwarding said user-plane voice packets to said called user over said logical channel and via said second user-plane entity.

9. A method according to claim 8, wherein said step of creating a logical user-plane channel comprises forwarding said user-plane leader packet to said called subscriber and establishing a logical call path between said first and second user-plane entities via which the leader packet is routed.

25 10. A method according to claim 9, wherein said step of forwarding said user-plane leader packet comprises the further steps of

inquiring an IP address of second communication entity from a communication control server on the basis of said identity of said receiving user,

30 routing said user-plane leader packet and subsequent voice packets to said IP address of said second communication entity.

11. A method according to claim 8, wherein said step of establishing a logical user-plane channel comprises initiating, in response to receiving said user-plane leader packet from said calling subscriber, a control-plane procedure to program first and second user-plane entities to support said call.

12. A method according to claim 11, wherein said second user-plane entity generates and sends a new user-plane leader packet containing said assigned call identifier to said called party.

13. A method according to claim 8, wherein said step of notifying
5 comprises sending a user-plane call setup acknowledgement packet containing said call identifier from said first user-plane entity to said calling user.

14. A method according to claim 13, comprising starting transmission of said subsequent voice packets from said calling user in response to said user-plane call setup acknowledgement packet.

10 15. A method according to claim 8, comprising sending a user-plane reception acknowledgement packet from said called user to said second user-plane entity in response to receiving said user-plane leader packet from said second entity.

15 16. A method according to claim 15, comprising sending, in response to receiving said user-plane reception acknowledgement packet from said called user, a user-plane call setup acknowledgement packet from said second user-plane entity to said first user-plane entity, and sending a user-plane call setup acknowledgement packet from said first user-plane entity to said calling user in order to enable the calling user to send the subsequent 20 user-plane voice packets.

25 17. A method according to claim 15, comprising considering said called user unreachable if said second user-plane entity does not receive a user-plane reception acknowledgement packet within a preset timeout, and notifying said calling user of said unreachability by a user-plane communication.

18. A method according to claim 8, wherein said user-plane leader packet comprises a description of communication capabilities said calling user wishes to use in said call.

30 19. A method according to claim 18, comprising sending a negative acknowledgement user-plane packet from said called user to said second user-plane entity if a terminal of said called user does not support said communication capabilities described in said leading packet.

35 20. A method according to claim 19, wherein said negative acknowledgement packet contains a description of the communication capabilities said called user wishes to use.

21. A method according to claim 8, wherein said user-plane packets are real-time audio transport packets, and wherein said leading packet is a real-time audio transport packet having a specific payload type.

22. A method according to claim 8, 14, 16 or 17, wherein said user-plane packets are real-time audio transport packets, and wherein said acknowledgement packet is a real-time audio transport packet having a specific payload type.

23. A method according to claim 11, wherein
said initiating of said control-plane procedure comprises sending an
event notification message from said first user-plane entity to a first user-specific control-plane entity serving said calling user, said notification message indicating that a one-to-one call is to be set up and containing said identifiers of said calling and called parties,

said first control-plane entity determines, on the basis of said identity of said called user, a second user-specific control-plane entity serving said called user,

said first control-plane entity instructs said second control-plane entity to define said second user-plane entity to support said call and to establish said user-plane logical channel,

20 said first control-plane entity instructs said second control-plane entity to configure said second user-plane entity to support said call and to establish said user-plane logical channel,

 said first control-plane entity configures said first control-plane entity to support said call and to establish said user-plane logical channel.

25 24. A communications system, comprising
logical control plane network entities,
logical user-plane network entities,
user terminals supporting packet-mode one-to-one voice communication,

30 each of said user terminals having a one-to-one call setup mechanism sending call setup signaling embedded in a user-plane traffic to one of said user-plane logical entities, said embedded user-plane signaling identifying a called user terminal,

35 a first mechanism establishing, in response to receiving said embedded user-plane call setup signaling, a logical call path between the

ones of said user-plane entities which are to be involved with routing of user-plane traffic related to said call, and

said logical user-plane entities having a second mechanism forwarding any subsequent user-plane traffic relating to said call over said call path from said calling subscriber to said called subscriber.

5 25. A system according to claim 24, wherein said user-plane traffic comprises real-time audio transport packets.

10 26. A system according to claim 25, wherein the embedded signaling comprises real-time audio transport packets having specific payload types.

15 27. A communications system, comprising
logical control plane network entities,
at least first and second user terminal supporting packet-mode one-to-one voice communication,

20 a dedicated user-specific logical user-plane network entity for each user terminal,

25 each user terminal having a one-to-one call setup mechanism sending a user-plane leader packet to a respective one of said first user-plane network entities in order to start a one-to-one voice call, said leader packet containing identifier of a calling user and a called user, means responsive to receiving said user-plane leader packet from said calling user for creating a logical user-plane channel between a user-plane network entity of a calling user terminal to a user-plane network entity of a called user terminal,

means for assigning a call identifier for said call,

30 means for notifying said call identifier to the calling user terminal,

means at said user-plane network entity of said called user for sending a user-plane leader packet from said user-plane network entity of said called user terminal to said called user terminal, said leading packet containing said call identifier,

means at said first and second user-plane network entities for forwarding user-plane voice packets sent by said calling user terminal and provided with said call identifier to said called user terminal over said logical user-plane channel.

28. A system according to claim 27, further comprising means for inquiring an IP address of second communication entity from a communication control server on the basis of said identity of said receiving user,

5 means for routing said leader packet and subsequent voice packets to said IP address of said second communication entity.

10 29. A system according to claim 27, wherein said means for creating a logical channel comprises means for initiating, in response to receiving said embedded call setup signaling from said calling subscriber, a control-plane procedure to program said user-plane entities which are to be involved with routing of the call related user-plane traffic, to support said call.

15 30. A system according to claim 29, comprising a first user-specific control-plane entity serving said calling user, a second user-specific control-plane entity serving said called user, said means for initiating said control-plane procedure comprising means for sending an event notification message from said user-plane entity of said calling user to said first control-plane entity, said notification message indicating that a one-to-one call is to be set up and containing said identifiers of said calling and called user,

20 said first control-plane entity comprising means for determining, on the basis of said identity of said called user, said second user-specific control-plane entity,

25 said first control-plane entity comprising means for requesting said second control-plane entity to define said user-plane entity of said called user to support said call and to establish said user-plane logical channel,

said first control-plane entity comprising means for configuring said control-plane entity of said calling user to support said call and to establish said user-plane logical channel.

30 31. A system according to any one of claims 27 to 30 , wherein said means for notifying said call identifier comprises means for sending a user-plane call setup acknowledgement packet containing said call identifier from said user-plane network entity of said calling user terminal to said calling user terminal.

35 32. A system according to claim 31, wherein said calling user terminal is arranged to start transmission of said subsequent voice packets from said calling user in response to said notifying.

33. A system according to any one of claims 27 to 30, wherein said called user terminal is arranged to send a user-plane reception acknowledgement packet to said user-plane network entity of said called user in response to receiving said user-plane leading packet.

5 34. A system according to claim 23, comprising means for sending, in response to receiving said user-plane reception acknowledgement packet from said called user, a user-plane call setup acknowledgement packet from said user-plane entity of said called user to said user-plane entity of said calling user, and means for sending a user-plane call setup acknowledgement 10 packet from said user-plane entity of said calling user to said calling user terminal in order to enable the calling user to send the subsequent user-plane voice packets.

15 35. A system according to claim 33, wherein said user-plane entity of said called user considers said called user unreachable in response to not receiving a reception acknowledgement packet within a preset timeout, and notifies said calling user of said unreachability.

36. A system according to any one of claims 27 to 30, wherein said leading packet contains a description of communication capabilities said calling user wishes to use in said call.

20 37. A system according to claim 36, wherein said called user terminal comprises means for sending a negative user-plane acknowledgement packet to its user-plane network entity if said called user terminal does not support said communication capabilities described in said leading packet.

25 38. A system according to claim 37, wherein said negative user-plane acknowledgement packet contains a description of the communication capabilities said called user wishes to use.

30 39. A system according to any one of claims 27 to 30, wherein said user-plane packets are real-time audio transport packets, and wherein said user-plane leading packet is a real-time audio transport packet having a specific payload type.

40. A system according to claim 31, wherein said user-plane packets are real-time audio transport packets, and wherein said user-plane call setup acknowledgement packet is a real-time audio transport packet having a specific payload type.

41. A network element for a communication system, said network element comprising a dedicated user-plane logical network entity for at least one user terminal supporting a one-to-one voice communication, said user-plane network entity comprising

- 5 (i) means for receiving a user-plane leader packet sent by a calling user terminal in order to start a one-to-one voice call, said leader packet containing identifier of a calling user and a called user,
- 10 (ii) means for creating a logical channel to a user-plane network entity of said called user terminal in response to receiving said user-plane leader packet,
- (iii) means for assigning a call identifier,
- (iv) means for notifying the calling user terminal of said call identifier by a user-plane communication,
- 15 (v) means for sending a user-plane leader packet from said second user-plane entity to said called user, said leader packet containing said call identifier,
- (vi) means for forwarding user-plane voice packets sent by said calling user terminal and provided with said call identifier to said user-plane network entity of said called user terminal over said logical channel.

20 42. A user terminal for communications system, said user terminal comprising

25 a one-to-one call setup mechanism sending a user-plane leader packet to a user-specific logical user-plane network entity in order to start a one-to-one voice call, said leader packet containing identifier of a calling user and a called user,

 means for starting to send user-plane voice packets to said user-plane network entity in response to receiving a user-plane call setup acknowledgement packet containing a call identifier, said voice packets containing said call identifier.

30 43. A user terminal according to claim 41, wherein said user-plane leader packet contains a description of the communication capabilities said user terminal wishes to use.

35 44. A user terminal according to claim 42, comprising
 means for receiving from said user-specific user-plane network entity a user-plane leader packet originating from another user terminal and containing a call identifier,

means for sending a user-plane reception acknowledgement to said user-specific user-plane network entity.

45. A user terminal according to claim 42, comprising
means for receiving from said user-specific user-plane network
entity a user-plane leader packet originating from another user terminal and
containing a description of the communication capabilities said other user
terminal wishes to use,

means for sending a negative user-plane acknowledgement packet
to said user-specific user-plane network entity, if said called user terminal does
not support said communication capabilities described in said leading packet,
and sending a positive user-plane acknowledgement otherwise.

46. A user terminal according to claim 42, wherein said user-plane
packets are real-time audio transport packets, and wherein said user-plane
leading packet is a real-time audio transport packet having a specific payload
type.

47 A user terminal according to claim 43, 44 or 45, wherein said
user-plane packets are real-time audio transport packets, and wherein said
user-plane acknowledgement packet is a real-time audio transport packet
having a specific payload type.